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**United States Patent** [19]

Knutson et al.

[11] Patent Number: **5,861,386**[45] Date of Patent: **Jan. 19, 1999**[54] **METHOD FOR TREATING AND PREVENTING SECONDARY HYPERPARATHYROIDISM**

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[73] Assignee: **Bone Care International, Inc.**, Madison, Wis.[21] Appl. No.: **907,658**[22] Filed: **Aug. 8, 1997****Related U.S. Application Data**

[63] Continuation of Ser. No. 798,958, Feb. 11, 1997, Pat. No. 5,707,980, which is a continuation of Ser. No. 415,488, Apr. 3, 1995, Pat. No. 5,602,116, which is a continuation-in-part of Ser. No. 119,895, Sep. 10, 1993, Pat. No. 5,403,831, which is a continuation of Ser. No. 812,056, Dec. 17, 1991, abandoned, which is a continuation of Ser. No. 569,412, Aug. 17, 1990, Pat. No. 5,104,864, which is a continuation of Ser. No. 227,371, Aug. 2, 1988, abandoned.

[51] Int. Cl. <sup>6</sup> **A61K 31/59**[52] U.S. Cl. **514/167**[58] Field of Search **514/167**[56] **References Cited****U.S. PATENT DOCUMENTS**

3,907,843	9/1975	DeLuca et al.	260/397.2
4,195,027	3/1980	DeLuca et al.	260/387.2
4,202,829	5/1980	DeLuca et al.	260/387.2
4,225,596	9/1980	DeLuca	424/236
4,234,495	11/1980	DeLuca et al.	360/387.2
4,260,549	4/1981	DeLuca et al.	260/397.2
4,554,106	11/1985	DeLuca et al.	260/397.2
4,555,364	11/1985	DeLuca et al.	260/397.2
5,063,221	11/1991	Nishii et al.	514/167
5,707,980	1/1998	Knutson et al.	514/167

**OTHER PUBLICATIONS**M. F. Holick et al., *Proc. Natl. Acad. Sci. USA* 68, 803-804 (1971).G. Jones et al., *Biochemistry* 14, 1250-1256 (1975).M. F. Holick et al., *Science* 180, 190, 191 (1973).H. Y. Lam et al., *Science* 486, 1038-1040 (1974).S. M. Ott, C. H. Chesnut, *Annals of Int. Med.* 1989, 110:267-274.J. C. Gallagher et al., *Annals of Int. Med.* 1990, 113:649-655.J. Aloia et al., *Amer. J. Med.* 84:401-08 (1988).M. Shiraki et al., *Endocrinol. Japan* 32, 305-315 (1985).G. F. Jensen et al., *Clin. Endocrinol.* 16, 515-524 (1982).C. Christiansen et al., *Eur. J. Clin. Invest.* 11, 305-309 (1981).O. H. Sorensen et al., *Clin. Endocrinol.* 7, 169S-175S (1977).H. Oriomo et al., *Bone and Mineral* 3, 47-52 (1987).G. Sjoden et al., *J. Nutr.* 114, 2043-2046 (1984).G. Sjoden et al., *Proc. Soc. Exp. Biol. Med.* 178, 432-436 (1985).*The Merck Index*, 11th ed. (1989) p. 9932.*J. Bone Min. Res.*; 1994; 9:607-614.*Biochem. J.*, vol. 310, No. 1 (Aug. 15, 1995) pp. 233-241.*Endocrinology*, vol. 136, No. 11 (Nov. 1995) pp. 4749-4753.**Primary Examiner**—Theodore J. Criares**Attorney, Agent, or Firm**—Teresa J. Welch; Stroud, Stroud, Willink, Thompson & Howard[57] **ABSTRACT**

A method for preventing loss of bone mass or bone mineral content in a human being suffering from secondary hyperparathyroidism by administering a sufficient amount of 1 $\alpha$ -OH vitamin D<sub>2</sub>, 1 $\alpha$ ,24(S)-(OH)<sub>2</sub> vitamin D<sub>2</sub>, 1 $\alpha$ -OH vitamin D<sub>4</sub> or 1 $\alpha$ ,24(R)-(OH)<sub>2</sub> vitamin D<sub>4</sub>.

**14 Claims, No Drawings**